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EXAMINER

HUYNH, PHUONG N

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1644

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24

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/290,029

Applicant(s)

BOTTOMLY ET AL.

Examiner

"Neon" Phuong Huynh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE Three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 30 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 282-337 is/are pending in the application.
- 4a) Of the above claim(s) 291 and 303-337 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 282-290 and 292-302 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

1. Claims 282-337 are pending.
2. Newly added claims 303-337 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

The elected invention comprises *a method of modulating an immune system response* to an antigen away from a Th2 response comprising isolating one or more pAPC from an individual and exposing said pAPC to an inducing agent factor concurrently with exposure to a protein antigen then **administering said pAPC to a subject** that read on elected species consisting of:

- (a) pAPC - dendritic cell,
- (b) factor - CpG (Th1 inducing agent),
- (c) antigen - crude antigen preparation,
- (d) Targeting agent - Fc receptor ligand (FcRL), mannose receptor and DEC-205 and
- (e) encapsulating device - liposome.

Newly added Claims 303-322 are drawn to *a method of modulating an immune system response* to an allergen comprising isolating one or more pAPC from an individual, exposing said pAPC to an allergen and a factor, **administering T-cell to the subject**.

Newly added claims 323-337 are drawn to *a method of treating allergy* wherein the method comprising the steps of: **identifying an individual** who is allergic to an allergen, providing a composition of pAPC displaying the allergen, contacting the composition with T cells of the individual in the presence of a factor and **administering the T cells to the individual** to that immune response of the individual to the allergen is modulated away from a Th2 response. Since Applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 303-327 are withdrawn from consideration as being directed to a non-elected invention. See 37 C.F.R. 1.142(b) and MPEP § 821.03.

3. Claims 291 and 303-337 (newly added non-elected inventions) are withdrawn from further consideration by the examiner, 37 C.F.R. 1.142(b) as being drawn to non-elected inventions.

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4. Claims 282-290 and 292-302, drawn to *a method of modulating an immune system response* to an antigen away from a Th2 response comprising isolating one or more pAPC from an individual and exposing said pAPC to an inducing agent factor concurrently with exposure to a protein antigen then **administering said pAPC to a subject** that read on elected species consisting of:
 - (a) pAPC - dendritic cell,
 - (b) factor - CpG (Th1 inducing agent),
 - (c) antigen - crude antigen preparation,
 - (d) Targeting agent - Fc receptor ligand (FcRL), mannose receptor and DEC-205 and
 - (e) Encapsulating device - liposome are being acted upon in this Office Action.
5. Applicant's arguments with respect to claims 50-55, 60, 63-66, 79-81, 83-91, 93-97, 102-104, 108-112, 115-116, 122-123, 125-126, 129, 136-139, 141-150, 152-156, 160-175, 184-185, and 187-191 have been considered but are moot in view of the new ground(s) of rejection necessitated by the amendment filed 9/30/02.
6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 103(a) that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless:

 - (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
7. This application currently names joint inventors. In considering Patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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8. Claims 282-287, 289 and 302 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat No 5,994,126 (of record, Nov 30, 1999) in view of WO 98/37919 (of record, Sept 1998).

The '126 patent teaches a method of modulating an immune response to any antigen comprising isolating professional antigen presenting cell (pAPC) such as mature and precursor dendritic cells from an individual (See column 5, lines 53-65, claims 1, in particular), and exposing said pAPC to any crude antigen such as allergen in vitro (See column 20, lines 40-41, column 6, lines 1-5, column 21, lines 29-31, in particular) followed by administering said allergen-exposed pAPC to a subject (See column 24, lines 37-40, column 24, lines 47-51, in particular). Claim 285 is included in this rejection because pAPC are immature prior to exposure to any antigen. The '126 patent teaches the antigen activated dendritic cells are useful for producing strong immune response due to the presentation of antigen by the dendritic cells in the individual (See column 22, lines 58-67 bridging column 23, line 1, in particular).

The claimed invention as recited in claim 282 differs from the reference only that the method wherein the pAPC is exposed to an allergen and a factor such as oligonucleotides containing CpG motifs and that the immune response of the individual to the allergen is modulated away from a Th2 response.

The WO 98/37919 publication teaches that an immune response can be redirected away from a Th2 response towards a Th1 immune response with a factor such as unmethylated cytosine-guanine (CpG) that induces monocytic and other cells to produce Th1 cytokines such as IL-12, and IFN- γ which is indicative of Th1 type immune response (See Summary of Invention, page 4, lines 18-22, Fig 2, page 8, line 1-2, in particular). The reference CpG is useful for treating a subject with asthma associated with increased reactivity of the airway to inhaled allergen (See page 23-26, in particular).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform a method of modulating an immune system response to any allergen comprising isolating pAPC, exposing said pAPC to any allergen as taught by the '126 patent and the factor such as CpG as taught by the WO 98/37919 publication, follows by administering said allergen-exposed pAPC to the individual as taught by the '126 patent so that immune response of the individual to said allergen is modulated away from a Th2 response toward a Th1 response as taught by the WO98/37919 publication. From the combined teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention.

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One having ordinary skill in the art would have been motivated to do this because the '126 patent teaches the allergen activated dendritic cells are useful for producing strong immune response due to the presentation of antigen by the dendritic cells in the individual (See column 22, lines 58-67 bridging column 23, line 1, in particular). The WO 98/37919 publication teaches CpG is useful for treating a subject with asthma associated with increased reactivity of the airway to inhaled allergen (See page 23-26, in particular) by redirecting immune response away from a Th2 response towards a Th1 immune response (See Summary of Invention, page 4, lines 18-22, Fig 2, page 8, line 1-2, in particular).

Applicants' arguments filed 9/30/02 have been fully considered but are not found persuasive.

Applicants' position is that (1) the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, (2) Maurer et al provide no teachings or suggestion of modulating an immune response away from a Th2 response. (3) The WO 98/37919 provides no motivation to bias an immune away from a Th2 response. The WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro. (4) The examiner is relying on hindsight reconstruction.

In response to applicant's arguments against the references individually, one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). See MPEP 2145.

In response to applicant's argument that the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, the WO 98/37919 publication teaches that an immune response can be redirected away from a Th2 response towards a Th1 immune response with a factor such as unmethylated cytosine-guanine (CpG) that induces monocyte and other cells to produce Th1 cytokines such as IL-12, and IFN- γ which is indicative of Th1 type immune response (See Summary of Invention, page 4, lines 18-22, Fig 2, page 8, line 1-2, in particular). The reference CpG is useful for treating a subject with asthma associated with increased reactivity of the airway to inhaled allergen (See page 23-26, in particular).

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In response to applicant's argument that Maurer *et al* provide no teachings or suggestion of modulating an immune response away from a Th2 response, Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular). Maurer *et al* teach that dendritic cells express C-type lectin receptor, DEC-205 and FcγRII and mannose receptor that enable efficient capture of IgG complexed antigens (See page 175, last paragraph, page 176, first paragraph, in particular).

In response to applicant's argument that the WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro, the '126 patent teaches a method of modulating an immune response to any antigen comprising isolating professional antigen presenting cell (pAPC) such as mature and precursor dendritic cells from an individual (See column 5, lines 53-65, claims 1, in particular), and exposing said pAPC to any crude antigen such as allergen in vitro (See column 20, lines 40-41, column 6, lines 1-5, column 21, lines 29-31, in particular) followed by administering said allergen-exposed pAPC to a subject (See column 24, lines 37-40, column 24, lines 47-51, in particular).

In response to applicant's argument that the examiner is relying on hindsight reconstruction, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. In re McLaughlin, 170 USPQ 209 (CCPA 1971).

9. Claims 290, 292-293, and 295-300 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat No 5,994,126 (of record, Nov 30, 1999; PTO 892), WO 98/37919 publication (of record, Sept 1998; PTO 892) as applied to claims 282-287, 289 and 302 mentioned above and further in view of Maurer *et al* (of record, 1997; PTO 1449).

The combined teachings of the '126 patent and the WO 98/37919 have been discussed supra.

The claimed invention as recited in claim 290 differs from the references only that the method wherein the allergen is associated with a targeting agent.

The claimed invention as recited in claim 292 differs from the references only that the method wherein one or both of the allergen and factor are associated with a targeting agent.

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The claimed invention as recited in claim 293 differs from the references only that the method wherein the targeting agent is a Fc receptor ligand.

The claimed invention as recited in claim 294 differs from the references only that the method wherein the targeting agent is capable of targeting to intracellular vesicles within pAPCs.

The claimed invention as recited in claim 295 differs from the references only that the method wherein the targeting agent comprises at least the Fc portion of an Ig molecule.

The claimed invention as recited in claim 296 differs from the references only that the method wherein the targeting agent comprises at least the Fc portion of an IgG molecule.

The claimed invention as recited in claim 297 differs from the references only that the method wherein one or both of the allergen and factor such as CpG are encapsulated in liposome.

The claimed invention as recited in claim 298 differs from the references only that the method wherein the allergen and factor such as CpG are encapsulated in liposome together.

The claimed invention as recited in claim 299 differs from the references only that the method wherein the allergen and factor such as CpG are encapsulated in liposome separately.

The claimed invention as recited in claim 300 differs from the references only that the method wherein one or both of the allergen and factor are encapsulated and associated with a targeting agent.

Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular). Maurer *et al* teach that dendritic cells express C-type lectin receptor, DEC-205 and FcγRII and mannose receptor that enable efficient capture of IgG complexed antigens (See page 175, last paragraph, page 176, first paragraph, in particular). Maurer *et al* also teach implications for treatment of allergy, and that FcR-IgE dependent allergen uptake by dendritic cells “may both quantitatively and qualitatively modulate allergen presentation in vitro may have profound implications on the magnitude and diversification of allergen specific T cell responses in human disease” (See page 177, final 3 lines in particular).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to encapsulate any allergen as taught by the ‘126 separately or together with the factor such as CpG as taught by the WO 98/37919 publication in a liposome and targeting the encapsulated allergen and/or CpG using the targeting agent such as the Fc receptor ligand as taught by Maurer *et al* to modulate an immune system response to an allergen in vitro and then administering the “exposed dendritic cells” to the individual as taught by the ‘126 patent to

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modulate away from a Th2 response toward the Th1 immune response as taught by the WO 98/37919 publication. From the combined teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Claims 298 and 299 are included in this rejection because encapsulating allergen and factor in separate or the same liposome(s) does not lend any patentable weight because the liposomes are targeted to the same endocytic pathway and the antigen and factor would end up in the same vesicles of the same dendritic cells. Claims 295 and 296 are included in this rejection because Maurer et al teach the entire IgG molecule that would encompassed within the meaning of "at least the Fc portion" of an Ig molecule" as recited in claim 295 and "at least the Fc portion of an IgG molecule" as recited in claim 296.

One having ordinary skill in the art would have been motivated to do this because Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by antigen presenting cell such as dendritic cell (See page 176, paragraph 4, in particular) to modulate an immune response such as allergy for therapeutic purposes as taught by both the '126 patent and Maurer et al.

Applicants' arguments filed 9/30/02 have been fully considered but are not found persuasive.

Applicants' position is that (1) the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, (2) Maurer et al provide no teachings or suggestion of modulating an immune response away from a Th2 response. (3) The WO 98/37919 provides no motivation to bias an immune away from a Th2 response. The WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro. (4) The examiner is relying on hindsight reconstruction.

In response to applicant's arguments against the references individually, one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. In re Keller , 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., Inc. , 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). See MPEP 2145.

In response to applicant's argument that the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, the WO 98/37919 publication

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teaches that an immune response can be redirected away from a Th2 response towards a Th1 immune response with a factor such as unmethylated cytosine-guanine (CpG) that induces monocytic and other cells to produce Th1 cytokines such as IL-12, and IFN- γ which is indicative of Th1 type immune response (See Summary of Invention, page 4, lines 18-22, Fig 2, page 8, line 1-2, in particular). The reference CpG is useful for treating a subject with asthma associated with increased reactivity of the airway to inhaled allergen (See page 23-26, in particular).

In response to applicant's argument that Maurer et al provide no teachings or suggestion of modulating an immune response away from a Th2 response, Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular). Maurer *et al* teach that dendritic cells express C-type lectin receptor, DEC-205 and Fc γ RII and mannose receptor that enable efficient capture of IgG complexed antigens (See page 175, last paragraph, page 176, first paragraph, in particular).

In response to applicant's argument that the WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro, the '126 patent teaches a method of modulating an immune response to any antigen comprising isolating professional antigen presenting cell (pAPC) such as mature and precursor dendritic cells from an individual (See column 5, lines 53-65, claims 1, in particular), and exposing said pAPC to any crude antigen such as allergen in vitro (See column 20, lines 40-41, column 6, lines 1-5, column 21, lines 29-31, in particular) followed by administering said allergen-exposed pAPC to a subject (See column 24, lines 37-40, column 24, lines 47-51, in particular).

In response to applicant's arguments that the examiner is relying on hindsight reconstruction, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. In re McLaughlin, 170 USPQ 209 (CCPA 1971).

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10. Claims 292, 294 and 297-299 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat No 5,994,126 (of record, Nov 30, 1999; PTO 892) in view of WO 98/37919 publication (of record, Sept 1998; PTO 892) as applied to claims 282-287, 289 and 302 and further in view of WO 98/33520 (of record, PTO 1449).

The combined teachings of the '126 patent and the WO 98/37919 have been discussed supra.

The claimed invention as recited in claim 292 differs from the references only that the method wherein one or both of the allergen and factor are associated with a targeting agent.

The claimed invention as recited in claim 294 differs from the references only that the method wherein the targeting agent is capable of targeting to intracellular vesicles within pAPCs.

The claimed invention as recited in claim 297 differs from the references only that the method wherein one or both of the allergen and factor such as CpG are encapsulated in liposome.

The claimed invention as recited in claim 298 differs from the references only that the method wherein the allergen and factor such as CpG are encapsulated in liposome together.

The claimed invention as recited in claim 299 differs from the references only that the method wherein the allergen and factor such as CpG are encapsulated in liposome separately.

The WO 98/33520 publication teaches the use of liposomes as "encapsulating devices" for any antigens to increase their potency and clinical effectiveness (See page 6, paragraph 3, and page 7, at lines 8 and 24, in particular). The WO 98/33520 publication further teaches that liposomes can deliver exogenous antigens in to the endocytic pathway (i.e. intracellular vesicles) of antigen processing and presentation (See page 3, lines 1-19, in particular). The antigen encapsulated in the liposomes has beneficial features of delivering the antigen to the antigen presenting cell such as dendritic cell (pAPC), in turn, the antigen is presented on the cell surface of said dendritic cells (See page 6, paragraph 3, in particular). The WO 98/33520 publication further teaches that a mixture of immunomodulators can be encapsulated within the liposomes as well (See page 7, paragraph 2, in particular) and that the composition as a whole allows administration of lower doses of the individual components to have a greater effect (See page 8, lines 21-22, in particular). Finally, the WO 98/33520 publication teaches that "administering the immunomodulator in a vehicle containing the antigen both prolongs its half-life and delivers it is close proximity to the vaccine or antigen" (see page 9, lines 11-13, in particular).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the liposome as taught by the WO 98/33520 publication to encapsulate

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any allergen as taught by the '126 patent separately or together with the factor such as the CpG as taught by the WO 98/37919 publication to target the allergen to the antigen presenting pathway of antigen processing cells as taught by the WO 98/33520 publication to modulate an immune response away from Th2 response as taught by the '126 patent and the WO 98/37919. From the combined teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Claims 298 and 299 are included in this rejection because encapsulating allergen and factor in separate or the same liposome(s) does not lend any patentable weight because the liposomes are targeted to the same endocytic pathway and the antigen and factor would end up in the same vesicles of the same dendritic cells.

One having ordinary skill in the art would have been motivated to encapsulate the allergen taught by the '126 patent and/or the CpG taught by the WO 98/37919 publication to target the allergen and/or CpG to the endocytic pathway of antigen presenting cells because the WO 98/33520 publication teaches liposome encapsulation prolongs its half-life of the allergen/CpG and lowers the administration dose with a greater effect. delivers it is close proximity to the vaccine or antigen" (see page 9, lines 11-13, page 6, paragraph 3, and page 7, at lines 8 and 24, in particular).

Applicants' arguments filed 9/30/02 have been fully considered but are not found persuasive.

Applicants' position is that (1) the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, (2) Maurer et al provide no teachings or suggestion of modulating an immune response away from a Th2 response. (3) The WO 98/37919 provides no motivation to bias an immune away from a Th2 response. The WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro. (4) The examiner is relying on hindsight reconstruction.

In response to applicant's arguments against the references individually, one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). See MPEP 2145.

In response to applicant's argument that the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, the WO 98/37919 publication teaches that an immune response can be redirected away from a Th2 response towards a Th1 immune response with a factor such as unmethylated cytosine-guanine (CpG) that induces monocytic and other cells to produce Th1 cytokines such as IL-12, and IFN- γ which is indicative of Th1 type immune response (See Summary of Invention, page 4, lines 18-22, Fig 2, page 8, line 1-2, in particular). The reference CpG is useful for treating a subject with asthma associated with increased reactivity of the airway to inhaled allergen (See page 23-26, in particular).

In response to applicant's argument that Maurer et al provide no teachings or suggestion of modulating an immune response away from a Th2 response, Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular). Maurer *et al* teach that dendritic cells express C-type lectin receptor, DEC-205 and Fc γ RII and mannose receptor that enable efficient capture of IgG complexed antigens (See page 175, last paragraph, page 176, first paragraph, in particular).

In response to applicant's argument that the WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro, the '126 patent teaches a method of modulating an immune response to any antigen comprising isolating professional antigen presenting cell (pAPC) such as mature and precursor dendritic cells from an individual (See column 5, lines 53-65, claims 1, in particular), and exposing said pAPC to any crude antigen such as allergen in vitro (See column 20, lines 40-41, column 6, lines 1-5, column 21, lines 29-31, in particular) followed by administering said allergen-exposed pAPC to a subject (See column 24, lines 37-40, column 24, lines 47-51, in particular).

In response to applicant's argument that the examiner is relying on hindsight reconstruction, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. In re McLaughlin, 170 USPQ 209 (CCPA 1971).

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11. Claims 292, 296, and 300 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat No 5,994,126 (of record, Nov 30, 1999; PTO 892) in view of WO 98/37919 publication (of record, Sept 1998; PTO 892) as applied to claims 282-287, 289 and 302 mentioned above and further in view of Maurer et al (of record) and WO 98/33520 (of record, PTO 1449).

The combined teachings of the '126 patent and the WO 98/37919 have been discussed supra.

The claimed invention in claim 292 differs from the references only that the method wherein one or both of the allergen and factor are associated with a targeting agent.

The claimed invention in claim 296 differs from the references only that the method wherein the targeting agent comprises at least the Fc portion of an IgG molecule.

The claimed invention in claim 300 differs from the references only that the method wherein one or both of the allergen and factor are encapsulated and associated with a targeting agent.

Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular). Maurer *et al* teach that dendritic cells express C-type lectin receptor, DEC-205 and FcγRII and mannose receptor that enable efficient capture of IgG complexed antigens (See page 175, last paragraph, page 176, first paragraph, in particular). The term "comprises" is open-ended. It expands the Fc portion to include the entire IgG molecule as taught by Maurer *et al*.

The WO 98/33520 publication teaches the use of liposomes as "encapsulating devices" for any antigens to increase their potency and clinical effectiveness (See page 6, paragraph 3, and page 7, at lines 8 and 24, in particular). The WO 98/33520 publication further teaches that liposomes can deliver exogenous antigens in to the endocytic pathway (i.e. intracellular vesicles) of antigen processing and presentation (See page 3, lines 1-19, in particular). The antigen encapsulated in the liposomes has beneficial features of delivering the antigen to the antigen presenting cell such as dendritic cell (pAPC), in turn, the antigen is presented on the cell surface of said dendritic cells (See page 6, paragraph 3, in particular). The WO 98/33520 publication further teaches that a mixture of immunomodulators can be encapsulated within the liposomes as well (See page 7, paragraph 2, in particular) and that the composition as a whole allows administration of lower doses of the individual components to have a greater effect (See page 8, lines 21-22, in particular). Finally, the WO 98/33520 publication teaches that "administering the

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immunomodulator in a vehicle containing the antigen both prolongs its half-life and delivers it in close proximity to the vaccine or antigen" (see page 9, lines 11-13, in particular).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the liposome as taught by the WO 98/33520 publication to encapsulate any allergen as taught by the '126 patent separately or together with the factor such as the CpG as taught by the WO 98/37919 publication to target the allergen to the antigen presenting pathway of antigen processing cells as taught by the WO 98/33520 publication using the targeting agent such as the Fc portion of an ligand that binds to the Fc receptor as taught by Maurer *et al* in a method as taught by the '126 patent to modulate an immune response away from Th2 response toward the Th1 immune response as taught by the WO 98/37919. From the combined teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention.

One having ordinary skill in the art would have been motivated to use the encapsulated allergen, CpG motif and targeting agent to modulate an immune response away from a Th2 response as taught by the WO 98/37919 publication in the method taught by the '126 patent because it is a useful treatment modality for Type I allergic disease as taught by the WO98/37919 publication, the liposome increased the half-life of the antigen with an added benefit of decreased concentration (See page 8, lines 21-22, in particular), and the targeting agent would target the allergen and factor such as CpG to the endocytic pathway as taught by the Maurer *et al* since the Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular).

Applicants' arguments filed 9/30/02 have been fully considered but are not found persuasive.

Applicants' position is that (1) the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, (2) Maurer *et al* provide no teachings or suggestion of modulating an immune response away from a Th2 response. (3) The WO 98/37919 provides no motivation to bias an immune away from a Th2 response. The WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro. (4) The examiner is relying on hindsight reconstruction.

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In response to applicant's arguments against the references individually, one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. In re Keller , 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., Inc. , 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). See MPEP 2145.

In response to applicant's argument that the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, the WO 98/37919 publication teaches that an immune response can be redirected away from a Th2 response towards a Th1 immune response with a factor such as unmethylated cytosine-guanine (CpG) that induces monocytic and other cells to produce Th1 cytokines such as IL-12, and IFN- γ which is indicative of Th1 type immune response (See Summary of Invention, page 4, lines 18-22, Fig 2, page 8, line 1-2, in particular). The reference CpG is useful for treating a subject with asthma associated with increased reactivity of the airway to inhaled allergen (See page 23-26, in particular).

In response to applicant's argument that Maurer et al provide no teachings or suggestion of modulating an immune response away from a Th2 response, Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular). Maurer *et al* teach that dendritic cells express C-type lectin receptor, DEC-205 and Fc γ R2 and mannose receptor that enable efficient capture of IgG complexed antigens (See page 175, last paragraph, page 176, first paragraph, in particular).

In response to applicant's argument that the WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro, the '126 patent teaches a method of modulating an immune response to any antigen comprising isolating professional antigen presenting cell (pAPC) such as mature and precursor dendritic cells from an individual (See column 5, lines 53-65, claims 1, in particular), and exposing said pAPC to any crude antigen such as allergen in vitro (See column 20, lines 40-41, column 6, lines 1-5, column 21, lines 29-31, in particular) followed by administering said allergen-exposed pAPC to a subject (See column 24, lines 37-40, column 24, lines 47-51, in particular).

In response to applicant's argument that the examiner is relying on hindsight reconstruction, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was

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made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. In re McLaughlin, 170 USPQ 209 (CCPA 1971).

12. Claims 288 and 301 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat No 5,994,126 (of record, Nov 30, 1999) in view of WO 98/37919 (of record, Sept 1998) as applied to claims 282-287, 289 and 302 mentioned above and further in view of US Pat No 4,234,569 (Nov 1980, PTO 892).

The combined teachings of the '126 patent and the WO 98/37919 have been discussed supra.

The claimed invention as recited in claim 288 differs from the references only that the method wherein the step of exposing comprises exposing the cells to a crude allergen preparation.

The claimed invention as recited in claim 301 differs from the references only that the method wherein the step of exposing comprises exposing the cells to a modified allergen.

The '569 patent teaches a method of modifying any allergen such as aldehyde-treated allergen from highly purified or crude allergen preparation (See entire document, column 4 at line 55, column 5 at line 8-55, in particular). The '569 patent further teaches the modified allergen is suitable for immunotherapy (desensitization of individuals suffering from allergies (See abstract, in particular) because of its low allergenic reactivity and greatly reduces the risk of systemic allergic reaction and yet allowing the physician to reduce the number of injection relative to those of the native (crude preparation) (see column 3, lines 50-66, in particular).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform a method of modulating an immune system response to any allergen comprising isolating pAPC, exposing said pAPC to any modified allergen or allergen from crude preparation or highly purified allergen as taught by the '569 patent or any allergen as taught by the '126 patent and the factor such as CpG as taught by the WO 98/37919 publication, follows by administering said allergen-exposed pAPC to the individual as taught by the '126 patent so that immune response of the individual to said allergen is modulated away from a Th2 response toward a Th1 response as taught by the WO98/37919 publication. From the combined teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention.

One having ordinary skill in the art would have been motivated to do this because the '569 patent teaches the modified allergen is suitable for immunotherapy (desensitization of

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individuals suffering from allergies (See abstract, in particular) because of its low allergenic reactivity and greatly reduces the risk of systemic allergic reaction and yet allowing the physician to reduce the number of injection relative to those of the native (crude preparation) (see column 3, lines 50-66, in particular). The '126 patent teaches the allergen activated dendritic cells are useful for producing strong immune response due to the presentation of antigen by the dendritic cells in the individual (See column 22, lines 58-67 bridging column 23, line 1, in particular). The WO 98/37919 publication teaches CpG is useful for treating a subject with asthma associated with increased reactivity of the airway to inhaled allergen (See page 23-26, in particular) by redirecting immune response away from a Th2 response towards a Th1 immune response (See Summary of Invention, page 4, lines 18-22, Fig 2, page 8, line 1-2, in particular).

Applicants' arguments filed 9/30/02 have been fully considered but are not found persuasive.

Applicants' position is that (1) the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, (2) Maurer et al provide no teachings or suggestion of modulating an immune response away from a Th2 response. (3) The WO 98/37919 provides no motivation to bias an immune away from a Th2 response. The WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro. (4) The examiner is relying on hindsight reconstruction.

In response to applicant's arguments against the references individually, one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). See MPEP 2145.

In response to applicant's argument that the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, the WO 98/37919 publication teaches that an immune response can be redirected away from a Th2 response towards a Th1 immune response with a factor such as unmethylated cytosine-guanine (CpG) that induces monocyte and other cells to produce Th1 cytokines such as IL-12, and IFN- γ which is indicative of Th1 type immune response (See Summary of Invention, page 4, lines 18-22, Fig 2, page 8, line

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1-2, in particular). The reference CpG is useful for treating a subject with asthma associated with increased reactivity of the airway to inhaled allergen (See page 23-26, in particular).

In response to applicant's argument that Maurer *et al* provide no teachings or suggestion of modulating an immune response away from a Th2 response, Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular). Maurer *et al* teach that dendritic cells express C-type lectin receptor, DEC-205 and FcγRII and mannose receptor that enable efficient capture of IgG complexed antigens (See page 175, last paragraph, page 176, first paragraph, in particular).

In response to applicant's argument that the WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro, the '126 patent teaches a method of modulating an immune response to any antigen comprising isolating professional antigen presenting cell (pAPC) such as mature and precursor dendritic cells from an individual (See column 5, lines 53-65, claims 1, in particular), and exposing said pAPC to any crude antigen such as allergen in vitro (See column 20, lines 40-41, column 6, lines 1-5, column 21, lines 29-31, in particular) followed by administering said allergen-exposed pAPC to a subject (See column 24, lines 37-40, column 24, lines 47-51, in particular).

In response to applicant's argument that the examiner is relying on hindsight reconstruction, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. In re McLaughlin, 170 USPQ 209 (CCPA 1971).

13. Claims 282-287, 289 and 302 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat No 5,994,126 (of record, Nov 30, 1999) in view of Spiegelberg *et al* (of record, Allergy 53(45): 93-97, 1998; PTO 892) or Krieg *et al* (of record, BioDrugs 10(5): 341-346, 1998; PTO 892).

The '126 patent teaches a method of modulating an immune response to any antigen comprising isolating professional antigen presenting cell (pAPC) such as mature and precursor dendritic cells from an individual (See column 5, lines 53-65, claims 1, in particular), and exposing said pAPC to any crude antigen such as allergen (See column 20, lines 40-41, column 6,

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lines 1-5, column 21, lines 29-31, in particular) followed by administering said allergen-exposed pAPC to a subject (See column 24, lines 37-40, column 24, lines 47-51, in particular). Claim 285 is included in this rejection because pAPC are immature prior to exposure to any antigen. The '126 patent teaches the antigen activated dendritic cells are useful for producing strong immune response due to the presentation of antigen by the dendritic cells in the individual (See column 22, lines 58-67 bridging column 23, line 1, in particular).

The claimed invention as recited in claim 282 differs from the reference only that the method wherein the pAPC is exposed to an allergen and a factor such as oligonucleotides containing CpG motifs and that the immune response of the individual to the allergen is modulated away from a Th2 response.

Spiegelberg *et al* teach that IgE (ie Th2) response is inhibited by allergic gene immunization that is presented by dendritic cells and CpG motif immunostimulatory oligodeoxynucleotides (Th1 inducing agent) (See entire document, in particular). Spiegelberg *et al* teach that a form of immunization of allergen gene and CpG motif immunostimulatory oligodeoxynucleotides provides a greater advantage over conventional immunotherapy because the allergens are produced in the host cells and are mainly intracellular and therefore would not cause anaphylactic reactions. The gene vaccination resulted in Th1 immune response, which would be away from Th2 and IgE antibody response (See page 93, left column and right column, lines 1-6, in particular). The reference teaches that gene vaccination of an allergen induced a Th1 response even in the presence of an ongoing Th2 response (see page 95, right column, in particular). The reference further teaches that ISS ODN (CpG oligonucleotides) not only have a stimulatory effect on Th1 cell differentiation but also a suppressive effect on Th2 cell function in allergic inflammation.

Krieg *et al* teaches that CpG DNA creates a Th1 line cytokine environment (e.g. IL-12, IFN- γ and TNF α) and enhances the function of antigen-presenting cells, such as macrophages, monocytes, dendritic cells (ie pAPCs) and B cells that have bound specific allergen will be preferentially activated by factor such as CpG DNA (See page 343, column 1, Fig 1, in particular). Further, the reference teaches "recent experiments have demonstrated that the Th1-like effect of CpG DNA can be used to reverse the T helper-2 (Th2) immune response to an allergen, preventing disease in a mouse model of asthma" (see page 344, first column, paragraph 2, in particular).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform a method of modulating an immune response to an allergen comprising isolating pAPC, exposing said pAPC to any allergen as taught by the '126 patent and a factor such as CpG oligonucleotides (Th1 inducing agent) as taught by Spiegelberg *et al* and Krieg *et al*, follows by administering of said "exposed" pAPC to an individual as taught by the '126 patent to direct the immune response away from a Th2 towards a Th1 response to treat allergic disease as taught by Spiegelberg *et al* and Krieg *et al*. From the combined teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention.

One having ordinary skill in the art would have been motivated to do this because Spiegelberg *et al* teach ISS ODN (CpG oligonucleotides) not only have a stimulatory effect on Th1 cell differentiation but also a suppressive effect on Th2 cell function in allergic inflammation. Krieg *et al* teaches that CpG DNA creates a Th1 line cytokine environment (e.g. IL-12, IFN- γ and TNF α) and enhances the function of antigen-presenting cells such as dendritic cells (ie pAPCs) and is useful for reversing the T helper-2 (Th2) immune response to an allergen, preventing disease in a mouse model of asthma" (see page 344, first column, paragraph 2, in particular).

Applicants' arguments filed 9/30/02 have been fully considered but are not found persuasive.

Applicants' position is that (1) the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, (2) Maurer *et al* provide no teachings or suggestion of modulating an immune response away from a Th2 response. (3) The WO 98/37919 provides no motivation to bias an immune away from a Th2 response. The WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro. (4) The examiner is relying on hindsight reconstruction.

In response to applicant's arguments against the references individually, one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. In re Keller , 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., Inc. , 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). See MPEP 2145.

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In response to applicant's argument that the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, the WO 98/37919 publication teaches that an immune response can be redirected away from a Th2 response towards a Th1 immune response with a factor such as unmethylated cytosine-guanine (CpG) that induces monocyte and other cells to produce Th1 cytokines such as IL-12, and IFN- γ which is indicative of Th1 type immune response (See Summary of Invention, page 4, lines 18-22, Fig 2, page 8, line 1-2, in particular). The reference CpG is useful for treating a subject with asthma associated with increased reactivity of the airway to inhaled allergen (See page 23-26, in particular). Spiegelberg *et al* teach ISS ODN (CpG oligonucleotides) not only have a stimulatory effect on Th1 cell differentiation but also a suppressive effect on Th2 cell function in allergic inflammation. Krieg *et al* teaches that CpG DNA creates a Th1 like cytokine environment (e.g. IL-12, IFN- γ and TNF α) and enhances the function of antigen-presenting cells such as dendritic cells (ie pAPCs) and is useful for reversing the T helper-2 (Th2) immune response to an allergen, preventing disease in a mouse model of asthma" (see page 344, first column, paragraph 2, in particular). Krieg *et al* teaches "recent experiments have demonstrated that the Th1-like effect of CpG DNA can be used to reverse the T helper-2 (Th2) immune response to an allergen, preventing disease in a mouse model of asthma" (see page 344, first column, paragraph 2, in particular).

In response to applicant's argument that Maurer *et al* provide no teachings or suggestion of modulating an immune response away from a Th2 response, Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular). Maurer *et al* teach that dendritic cells express C-type lectin receptor, DEC-205 and Fc γ RII and mannose receptor that enable efficient capture of IgG complexed antigens (See page 175, last paragraph, page 176, first paragraph, in particular).

In response to applicant's argument that the WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro, the '126 patent teaches a method of modulating an immune response to any antigen comprising isolating professional antigen presenting cell (pAPC) such as mature and precursor dendritic cells from an individual (See column 5, lines 53-65, claims 1, in particular), and exposing said pAPC to any crude antigen such as allergen in vitro (See column 20, lines 40-41, column 6, lines 1-5, column 21, lines 29-31, in particular) followed

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by administering said allergen-exposed pAPC to a subject (See column 24, lines 37-40, column 24, lines 47-51, in particular).

In response to applicant's argument that the examiner is relying on hindsight reconstruction, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. In re McLaughlin, 170 USPQ 209 (CCPA 1971).

14. Claims 290 and 292-300 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat No 5,994,126 (of record, Nov 30, 1999) in view of Spiegelberg *et al* (of record, Allergy 53(45): 93-97, 1998; PTO 892) or Krieg *et al* (of record, BioDrugs 10(5): 341-346, 1998; PTO 892) as applied to claims 282-287, 289 and 302 mentioned above and further in view of Maurer *et al* (of record, 1997; PTO 1449).

The combined teachings of the '126 patent, Spiegelberg *et al* and Krieg *et al* have been discussed supra.

The claimed invention in claim 290 differs from the references only that the method wherein the allergen is associated with a targeting agent.

The claimed invention in claim 292 differs from the references only that the method wherein one or both of the allergen and factor are associated with a targeting agent.

The claimed invention in claim 293 differs from the references only that the method wherein the targeting agent is a Fc receptor ligand.

The claimed invention in claim 294 differs from the references only that the method wherein the targeting agent is capable of targeting to intracellular vesicles within pAPCs.

The claimed invention in claim 295 differs from the references only that the method wherein the targeting agent comprises at least the Fc portion of an Ig molecule.

The claimed invention in claim 296 differs from the references only that the method wherein the targeting agent comprises at least the Fc portion of an IgG molecule.

The claimed invention in claim 297 differs from the references only that the method wherein one or both of the allergen and factor such as CpG are encapsulated in liposome.

The claimed invention in claim 298 differs from the references only that the method wherein the allergen and factor such as CpG are encapsulated in liposome together.

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The claimed invention in claim 299 differs from the references only that the method wherein the allergen and factor such as CpG are encapsulated in liposome separately.

The claimed invention in claim 300 differs from the references only that the method wherein one or both of the allergen and factor are encapsulated and associated with a targeting agent.

Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular). Maurer *et al* teach that dendritic cells express C-type lectin receptor, DEC-205 and FcγRII and mannose receptor that enable efficient capture of IgG complexed antigens (See page 175, last paragraph, page 176, first paragraph, in particular). Maurer *et al* also teach implications for treatment of allergy, and that FcR-IgE dependent allergen uptake by dendritic cells “may both quantitatively and qualitatively modulate allergen presentation in vitro may have profound implications on the magnitude and diversification of allergen specific T cell responses in human disease” (See page 177, final 3 lines in particular).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to encapsulate any allergen as taught by the ‘126 separately or together with the factor such as CpG as taught by the Spiegelberg *et al* and Krieg *et al* in a liposome and targeting the encapsulated allergen and/or CpG using the targeting agent such as the Fc receptor ligand as taught by Maurer *et al* to modulate an immune system response to an allergen in vitro and then administering the “exposed dendritic cells” to the individual as taught by the ‘126 patent to modulate away from a Th2 response toward the Th1 immune response as taught by Spiegelberg *et al* and Krieg *et al*. From the combined teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Claims 298 and 299 are included in this rejection because encapsulating allergen and factor in separate or the same liposome(s) does not lend any patentable weight because the liposomes are targeted to the same endocytic pathway and the antigen and factor would end up in the same vesicles of the same dendritic cells. Claims 295 and 296 are included in this rejection because Maurer *et al* teach the entire IgG molecule that would encompassed within the meaning of “at least the Fc portion” of an Ig molecule” as recited in claim 295 and “at least the Fc portion of an IgG molecule” as recited in claim 296.

One having ordinary skill in the art would have been motivated to do this because Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by

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antigen presenting cell such as dendritic cell (See page 176, paragraph 4, in particular) to modulate an immune response such as allergy for therapeutic purposes as taught by both the '126 patent and Maurer et al.

Applicants' arguments filed 9/30/02 have been fully considered but are not found persuasive.

Applicants' position is that (1) the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, (2) Maurer et al provide no teachings or suggestion of modulating an immune response away from a Th2 response. (3) The WO 98/37919 provides no motivation to bias an immune away from a Th2 response. The WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro. (4) The examiner is relying on hindsight reconstruction.

In response to applicant's arguments against the references individually, one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. In re Keller , 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., Inc. , 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). See MPEP 2145.

In response to applicant's argument that the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, the WO 98/37919 publication teaches that an immune response can be redirected away from a Th2 response towards a Th1 immune response with a factor such as unmethylated cytosine-guanine (CpG) that induces monocyctic and other cells to produce Th1 cytokines such as IL-12, and IFN- γ which is indicative of Th1 type immune response (See Summary of Invention, page 4, lines 18-22, Fig 2, page 8, line 1-2, in particular). The reference CpG is useful for treating a subject with asthma associated with increased reactivity of the airway to inhaled allergen (See page 23-26, in particular). Spiegelberg *et al* teach ISS ODN (CpG oligonucleotides) not only have a stimulatory effect on Th1 cell differentiation but also a suppressive effect on Th2 cell function in allergic inflammation. Krieg *et al* teaches that CpG DNA creates a Th1 line cytokine environment (e.g. IL-12, IFN- γ and TNF α) and enhances the function of antigen-presenting cells such as dendritic cells (ie pAPCs) and is useful for reversing the T helper-2 (Th2) immune response to an allergen, preventing disease n a mouse model of asthma" (see page 344, first column, paragraph 2, in particular).

Krieg *et al* teaches "recent experiments have demonstrated that the Th1-like effect of CpG DNA can be used to reverse the T helper-2 (Th2) immune response to an allergen, preventing disease in a mouse model of asthma" (see page 344, first column, paragraph 2, in particular).

In response to applicant's argument that Maurer *et al* provide no teachings or suggestion of modulating an immune response away from a Th2 response, Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular). Maurer *et al* teach that dendritic cells express C-type lectin receptor, DEC-205 and FcγRII and mannose receptor that enable efficient capture of IgG complexed antigens (See page 175, last paragraph, page 176, first paragraph, in particular).

In response to applicant's argument that the WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro, the '126 patent teaches a method of modulating an immune response to any antigen comprising isolating professional antigen presenting cell (pAPC) such as mature and precursor dendritic cells from an individual (See column 5, lines 53-65, claims 1, in particular), and exposing said pAPC to any crude antigen such as allergen in vitro (See column 20, lines 40-41, column 6, lines 1-5, column 21, lines 29-31, in particular) followed by administering said allergen-exposed pAPC to a subject (See column 24, lines 37-40, column 24, lines 47-51, in particular).

In response to applicant's argument that the examiner is relying on hindsight reconstruction, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. In re McLaughlin, 170 USPQ 209 (CCPA 1971).

15. Claims 292, 296 and 300 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat No 5,994,126 (of record, Nov 30, 1999) in view of Spiegelberg *et al* (of record, Allergy 53(45): 93-97, 1998; PTO 892) or Krieg *et al* (of record, BioDrugs 10(5): 341-346, 1998; PTO 892) as applied to claims 282-287, 289 and 302 mentioned above and further in view of Maurer *et al* (of record) and WO 98/33520 (of record, PTO 1449).

The combined teachings of the '126 patent, Spiegelberg *et al* and Krieg *et al* have been discussed supra.

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The claimed invention in claim 292 differs from the references only that the method wherein one or both of the allergen and factor are associated with a targeting agent.

The claimed invention in claim 296 differs from the references only that the method wherein the targeting agent comprises at least the Fc portion of an IgG molecule.

The claimed invention in claim 300 differs from the references only that the method wherein one or both of the allergen and factor are encapsulated and associated with a targeting agent.

Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular). Maurer *et al* teach that dendritic cells express C-type lectin receptor, DEC-205 and FcγRII and mannose receptor that enable efficient capture of IgG complexed antigens (See page 175, last paragraph, page 176, first paragraph, in particular).

The WO 98/33520 publication teaches the use of liposomes as “encapsulating devices” for any antigens to increase their potency and clinical effectiveness (See page 6, paragraph 3, and page 7, at lines 8 and 24, in particular). The WO 98/33520 publication further teaches that liposomes can deliver exogenous antigens in to the endocytic pathway (i.e. intracellular vesicles) of antigen processing and presentation (See page 3, lines 1-19, in particular). The antigen encapsulated in the liposomes has beneficial features of delivering the antigen to the antigen presenting cell such as dendritic cell (pAPC), in turn, the antigen is presented on the cell surface of said dendritic cells (See page 6, paragraph 3, in particular). The WO 98/33520 publication further teaches that a mixture of immunomodulators can be encapsulated within the liposomes as well (See page 7, paragraph 2, in particular) and that the composition as a whole allows administration of lower doses of the individual components to have a greater effect (See page 8, lines 21-22, in particular). Finally, the WO 98/33520 publication teaches that “administering the immunomodulator in a vehicle containing the antigen both prolongs its half-life and delivers it is close proximity to the vaccine or antigen” (see page 9, lines 11-13, in particular).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the liposome as taught by the WO 98/33520 publication to encapsulate any allergen as taught by the ‘126 patent separately or together with the factor such as the CpG as taught by the Spiegelberg *et al* and Krieg *et al* to target the allergen to the antigen presenting pathway of antigen processing cells as taught by the WO 98/33520 publication and associated with the targeting agent such as the IgG molecule that comprises the Fc portion as taught by

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Maurer *et al* in a method as taught by the '126 patent to modulate an immune response away from Th2 response toward the Th1 immune response as taught by Spiegelberg *et al* and Krieg *et al*. From the combined teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. The term "comprises" is open-ended. It expands the Fc portion to include the entire IgG molecule as taught by Maurer *et al*.

One having ordinary skill in the art would have been motivated to use the encapsulated allergen, CpG motif and targeting agent to modulate an immune response away from a Th2 response as taught by the WO 98/37919 publication in the method taught by the '126 patent because it is a useful treatment modality for Type I allergic disease as taught by the WO98/37919 publication, the liposome increased the half-life of the antigen with an added benefit of decreased concentration (See page 8, lines 21-22, in particular), and the targeting agent would target the allergen and factor such as CpG to the endocytic pathway as taught by the Maurer *et al* since the Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular).

Applicants' arguments filed 9/30/02 have been fully considered but are not found persuasive.

Applicants' position is that (1) the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, (2) Maurer *et al* provide no teachings or suggestion of modulating an immune response away from a Th2 response. (3) The WO 98/37919 provides no motivation to bias an immune away from a Th2 response. The WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro. (4) The examiner is relying on hindsight reconstruction.

In response to applicant's arguments against the references individually, one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). See MPEP 2145.

In response to applicant's argument that the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, the WO 98/37919 publication

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teaches that an immune response can be redirected away from a Th2 response towards a Th1 immune response with a factor such as unmethylated cytosine-guanine (CpG) that induces monocytic and other cells to produce Th1 cytokines such as IL-12, and IFN- γ which is indicative of Th1 type immune response (See Summary of Invention, page 4, lines 18-22, Fig 2, page 8, line 1-2, in particular). The reference CpG is useful for treating a subject with asthma associated with increased reactivity of the airway to inhaled allergen (See page 23-26, in particular). Spiegelberg *et al* teach ISS ODN (CpG oligonucleotides) not only have a stimulatory effect on Th1 cell differentiation but also a suppressive effect on Th2 cell function in allergic inflammation. Krieg *et al* teaches that CpG DNA creates a Th1 line cytokine environment (e.g. IL-12, IFN- γ and TNF α) and enhances the function of antigen-presenting cells such as dendritic cells (ie pAPCs) and is useful for reversing the T helper-2 (Th2) immune response to an allergen, preventing disease in a mouse model of asthma" (see page 344, first column, paragraph 2, in particular). Krieg *et al* teaches "recent experiments have demonstrated that the Th1-like effect of CpG DNA can be used to reverse the T helper-2 (Th2) immune response to an allergen, preventing disease in a mouse model of asthma" (see page 344, first column, paragraph 2, in particular).

In response to applicant's argument that Maurer *et al* provide no teachings or suggestion of modulating an immune response away from a Th2 response, Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular). Maurer *et al* teach that dendritic cells express C-type lectin receptor, DEC-205 and Fc γ R2 and mannose receptor that enable efficient capture of IgG complexed antigens (See page 175, last paragraph, page 176, first paragraph, in particular).

In response to applicant's argument that the WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro, the '126 patent teaches a method of modulating an immune response to any antigen comprising isolating professional antigen presenting cell (pAPC) such as mature and precursor dendritic cells from an individual (See column 5, lines 53-65, claims 1, in particular), and exposing said pAPC to any crude antigen such as allergen in vitro (See column 20, lines 40-41, column 6, lines 1-5, column 21, lines 29-31, in particular) followed by administering said allergen-exposed pAPC to a subject (See column 24, lines 37-40, column 24, lines 47-51, in particular).

In response to applicant's argument that the examiner is relying on hindsight reconstruction, it must be recognized that any judgment on obviousness is in a sense necessarily a

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reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. *In re McLaughlin*, 170 USPQ 209 (CCPA 1971).

16. Claims 288 and 301 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat No 5,994,126 (of record, Nov 30, 1999) in view of Spiegelberg *et al* (of record, Allergy 53(45): 93-97, 1998; PTO 892) or Krieg *et al* (of record, BioDrugs 10(5): 341-346, 1998; PTO 892) as applied to claims 282-287, 289 and 302 mentioned above and further in view of US Pat No 4,234,569 (Nov 1980, PTO 892).

The combined teachings of the '126 patent, Spiegelberg *et al* and Krieg *et al* have been discussed supra.

The claimed invention as recited in claim 288 differs from the references only that the method wherein the step of exposing comprises exposing the cells to a crude allergen preparation.

The claimed invention as recited in claim 301 differs from the references only that the method wherein the step of exposing comprises exposing the cells to a modified allergen.

The '569 patent teaches a method of modifying any allergen such as aldehyde-treated allergen from highly purified or crude allergen preparation (See entire document, column 4 at line 55, column 5 at line 8-55, in particular). The '569 patent further teaches the modified allergen is suitable for immunotherapy (desensitization of individuals suffering from allergies (See abstract, in particular) because of its low allergenic reactivity and greatly reduces the risk of systemic allergic reaction and yet allowing the physician to reduce the number of injection relative to those of the native (crude preparation) (see column 3, lines 50-66, in particular).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform a method of modulating an immune system response to any allergen comprising isolating pAPC, exposing said pAPC to any modified allergen or allergen from crude preparation or highly purified allergen as taught by the '569 patent or any allergen as taught by the '126 patent and the factor such as CpG as taught by Spiegelberg *et al* and Krieg *et al*, follows by administering said allergen-exposed pAPC to the individual as taught by the '126 patent so that immune response of the individual to said allergen is modulated away from a Th2 response toward a Th1 response as taught by Spiegelberg *et al* and Krieg *et al*. From the

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combined teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention.

One having ordinary skill in the art would have been motivated to do this because the '569 patent teaches the modified allergen is suitable for immunotherapy (desensitization of individuals suffering from allergies (See abstract, in particular) because of its low allergenic reactivity and greatly reduces the risk of systemic allergic reaction and yet allowing the physician to reduce the number of injection relative to those of the native (crude preparation) (see column 3, lines 50-66, in particular). The '126 patent teaches the allergen activated dendritic cells are useful for producing strong immune response due to the presentation of antigen by the dendritic cells in the individual (See column 22, lines 58-67 bridging column 23, line 1, in particular). Spiegelberg *et al* teach ISS ODN (CpG oligonucleotides) not only have a stimulatory effect on Th1 cell differentiation but also a suppressive effect on Th2 cell function in allergic inflammation. Krieg *et al* teaches that CpG DNA creates a Th1 like cytokine environment (e.g. IL-12, IFN- γ and TNF α) and enhances the function of antigen-presenting cells such as dendritic cells (ie pAPCs) and is useful for reversing the T helper-2 (Th2) immune response to an allergen, preventing disease in a mouse model of asthma" (see page 344, first column, paragraph 2, in particular).

Applicants' arguments filed 9/30/02 have been fully considered but are not found persuasive.

Applicants' position is that (1) the '126 patent does not teach exposing the pAPC to allergen and a factor such as CpG-containing oligonucleotides so that the immune response to the allergen is modulated away from a Th2 response, (2) Maurer *et al* provide no teachings or suggestion of modulating an immune response away from a Th2 response. (3) The WO 98/37919 provides no motivation to bias an immune away from a Th2 response. The WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro. (4) The examiner is relying on hindsight reconstruction.

In response to applicant's arguments against the references individually, one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references. In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). See MPEP 2145.

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In response to applicant's argument that Maurer *et al* provide no teachings or suggestion of modulating an immune response away from a Th2 response, Maurer *et al* teach that an Fc receptor ligand such as IgG can facilitate the uptake of any antigen by a dendritic cell (See page 176, paragraph 4, in particular). Maurer *et al* teach that dendritic cells express C-type lectin receptor, DEC-205 and Fc γ RII and mannose receptor that enable efficient capture of IgG complexed antigens (See page 175, last paragraph, page 176, first paragraph, in particular).

In response to applicant's argument that the WO 98/37919 does not teach contacting of a factor such as CpG-containing oligonucleotide with cells in vitro and certainly does not teach contacting dendritic cells with a factor in vitro, the '126 patent teaches a method of modulating an immune response to any antigen comprising isolating professional antigen presenting cell (pAPC) such as mature and precursor dendritic cells from an individual (See column 5, lines 53-65, claims 1, in particular), and exposing said pAPC to any crude antigen such as allergen in vitro (See column 20, lines 40-41, column 6, lines 1-5, column 21, lines 29-31, in particular) followed

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by administering said allergen-exposed pAPC to a subject (See column 24, lines 37-40, column 24, lines 47-51, in particular).

In response to applicant's argument that the examiner is relying on hindsight reconstruction, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. In re McLaughlin, 170 USPQ 209 (CCPA 1971).

17. No claim is allowed.
18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to "Neon" Phuong Huynh whose telephone number is (703) 308-4844. The examiner can normally be reached Monday through Friday from 9:00 am to 6:00 p.m. A message may be left on the examiner's voice mail service. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Chan can be reached on (703) 308-3973. Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center 1600 receptionist whose telephone number is (703) 308-0196.

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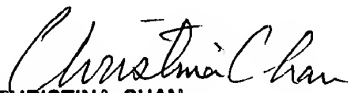
20. Papers related to this application may be submitted to Technology Center 1600 by facsimile transmission. Papers should be faxed to Technology Center 1600 via the PTO Fax Center located in Crystal Mall 1. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CM1 Fax Center telephone number is (703) 305-7401.

Phuong N. Huynh, Ph.D.

Patent Examiner

Technology Center 1600

January 13, 2003


CHRISTINA CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600